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Measuring 'Need for Recovery' as an indicator of staff wellbeing in the Emergency Department—a survey study

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Ethics
The chair of the regional Research Ethics Committee was prospectively approached for comment on this study and confirmed formal ethical approval was not required. The project was however registered with the Audit and Service Evaluation department at the host institution.

Competing Interest
None of the authors have any conflict of interest to declare

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Contribution of authors
Blair Graham coordinated study design and oversight of data collection, undertook initial data analysis, contributed to thematic analysis of free text comments, the first draft of the manuscript and subsequent revised versions, and approved the final version for submission.

Laura Cottey co-coordinated study design and oversight of data collection, contributed to data analysis including thematic analysis of free text comments, the first draft of the manuscript and subsequent revised versions, and approved the final version for submission.

Jason E Smith contributed to the development of the study design and contributed to the first draft of the manuscript and subsequent revised versions, and approved the final version for submission.

Mark Mills contributed to the development of the study design, undertook the initial data collection as part of his medical student special study module and approved the final version of the manuscript for submission.

Jos M Latour contributed to the development of the study design and contributed to the first draft of the manuscript and subsequent revised versions, and approved the final version for submission.

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SUMMARY

What is already known on this subject?

The Need for Recovery Scale has previously been used to assess workers' subjective need for physical and psychological recuperation following a period of work on a scale from 0, indicating no detectable need for recovery, to 100, indicating maximum need for recovery. A large study developing this scale documented an average Need for Recovery of 38 within the general population in the Netherlands.

The negative effects of increased need for recovery are cumulative and include increased risk of occupational burnout and adverse health outcomes.

What this study adds?

This is the first study to evaluate the use of the Need for Recovery Scale amongst Emergency Department staff. The study shows a baseline score of 81.8 out of 100 among Emergency Department staff. This is higher than any previously reported scores in other populations. Further research is needed to define the Need for Recovery among Emergency Department staff nationally.

ABSTRACT

Background

The Need for Recovery (NFR) scale is an 11-item questionnaire that assesses how work affects inter-shift recovery. Items are summated to form a score with a maximum value of 100. Previously reported scores range from 38 in nurses to 55 in miners. This study aimed to determine the NFR score amongst Emergency Department (ED) staff, and to identify whether NFR score was associated with characteristics potentially implicated with recovery from work.

Methods

Staff in a single UK ED (annual attendances 93,000) were asked to complete an electronic questionnaire incorporating the NFR scale plus additional items relating to demographic, work-related and wellbeing characteristics, in their own time. Descriptive statistics are presented including median NFR scores and associations with additional characteristics. Thematic analysis of free text comments from an open-ended question was undertaken.

Results

One hundred and sixty-eight responses were obtained (80.3% capture). Median NFR score across all staff groups was 81.8 out of 100 (95%CI 72.7-duration exceeding 12 hours ($p<0.05$). Dissatisfaction with work-life balance and self-reported perceptions of burnout were associated with elevated NFR scores ($p<0.01$). Themes resulting from the open-ended question were ‘barriers to inter-shift recovery’ and ‘coping with work’.

Conclusion

The NFR score in this study exceeded scores reported elsewhere and were associated with some demographic, occupational and wellbeing characteristics. The NFR scale has utility to measure the need for inter-shift recovery among ED staff. A larger study is warranted to identify specific determinants of recovery and provide recommendations.

Introduction

The unpredictable and often stressful nature of clinical work in the emergency department (ED) is a prominent concern for ED staff and healthcare providers internationally.[1] ED staff are frequently required to work rota patterns consisting of consecutive long shifts. As a result, they frequently encounter fatigue whilst at work, which may contribute towards reduced productivity, impaired personal wellbeing, and increased rates of error.[2,3]

The concept of Need for Recovery (NFR) describes an individual's subjective requirement to physically and mentally recuperate following a period of work and should be as low as possible.[4] Adequate recovery is required to offset high work demands and mitigate against the development of work-related stress and psychological overload. When an individual cannot adequately recover from a period of work, NFR may cumulatively increase and result in a negative impact on physical health, psychosocial wellbeing and occupational performance. Persistently increased NFR is associated with a range of long term health effects including neuroendocrine dysfunction, depression, cardiovascular disease, psychosomatic complaints and sickness absence.[5-9] Although NFR is not explicitly recognised within current definitions of occupational burnout,[10] fatigue and impaired recovery may precede the onset of burnout.[11] As such, NFR may be a particularly useful focus for assisting in the primary prevention of burnout and identification of individuals and groups at high risk.

Although NFR has received comparatively little attention in the emergency care literature compared to burnout, the cumulative detrimental effect of insufficient recovery on health outcomes means that measurement of NFR may be particularly relevant for staff working in unscheduled care settings, whose work demands are frequently intense and defined by irregular working patterns.[2, 12] Furthermore, the identification of factors contributing to prolonged NFR may inform initiatives to improve staff wellbeing in the ED. Such approaches may stand to improve workforce health, and also to improve the recruitment and retention of ED staff.

The NFR scale was originally developed as part of the Dutch Questionnaire on the Experience and Evaluation of work (QEEW). Each of the eleven items is scored using a dichotomous 'yes/no' response. Items are then summated to yield a score which ranges from 0, indicating no recordable NFR, to 100, indicating maximum attainable NFR (Electronic Supplementary Material 1).[4] A validation study within the Netherlands (n=12,095) suggested a baseline average NFR score of 38 out of 100 within a general population.[12] This was noted to have a negative skew, with the highest proportion of respondents reporting a low NFR score. Additional studies demonstrate that NFR is broadly similar among a range of occupations including ambulance staff in the Netherlands (NFR Score 43.6),[8] nurses in Brazil (NFR Score 36.4)[13] and non-healthcare related occupations such as seafarers and outdoor instructors in the UK (NFR Score 36.4 and 35.6, respectively).[14,15] To date, the highest occupational NFR identified in the literature is amongst underground mine workers in Iran (NFR Score 55.2).[16]

Whilst burnout scales such as the Maslach and Copenhagen Burnout Inventories are commonly included within wellbeing surveys aimed at ED staff,[17,18] these do not directly measure NFR. As such, the NFR scale may provide a useful and straightforward means of measuring an additional important concept related to wellbeing among ED staff.

Research Question

What is the baseline NFR score amongst staff working in a single UK ED?

Aims

This study aimed to determine the baseline NFR score of staff working within a single UK ED, and to assess whether NFR score is associated with selected demographic, occupational and wellbeing characteristics potentially implicated with impaired recovery from work.

Methods

A single centre cross-sectional staff survey with thematic analysis of free text responses to an open-ended question was conducted. The survey was hosted

securely using an online platform and was designed in accordance with relevant sections of the *che*cklist of *r*eporting *r*esults of *i*nternet *e*-surveys (CHERRIES).[19] The e-survey included the validated eleven-item NFR scale plus additional self-reported demographic, rota and wellbeing characteristics. A minor amendment to one NFR item was made to increase the applicability to shift workers (Item 4; from 'After the evening meal,
I generally feel in good shape' to 'After my breaks I feel fresh
to continue my work'). The e-survey consisted of seven pages in total (43 items) and could be openly accessed by any respondent provided with the relevant internet hyperlink. No personal identifiable information was collected at any point. No items were compulsory, and review of answers was allowed. Item randomisation and adaptive questioning was not used. Respondent information was provided, and informed consent obtained at the beginning of the survey. Signposting to relevant support services was provided on the final page. A panel of independent reviewers outside the study population assessed the readability of items and functionality of the online questionnaire prior to distribution.

Demographic and work pattern characteristics

To facilitate exploration of possible associations between NFR scores and respondents' demographics and work pattern, researchers identified characteristics featured in existing studies with potential to affect recovery from work.[6,9,12] These were used as the basis for creating items additional to the NFR scale and included respondents' profession, age, gender, shift pattern, contract type (full time *vs.* less than full time), and duration of shifts. These characteristics were reported using nominal and ordinal scales.

Wellbeing characteristics

A further five additional items were designed by the research team to explore the possible relationship between NFR and respondents' subjective perception of personal wellbeing. These related to the presence of long-term health conditions or disabilities, caring responsibilities outside of work, self-perception of current burnout and future burnout, and satisfaction with 'work-life balance' (Electronic Supplementary Material 2). To maintain consistency

with the original NFR scale items, wellbeing characteristics were reported using a dichotomous 'yes'/'no' response.

An optional question with free-text response was provided at the end of the survey to explore suggestions from respondents of how to improve their ability to recover between shifts:

> *"Do you have any suggestions which you feel might improve your ability to recover between shifts?"*

Recruitment

All permanent staff (n=209) working in a single large ED (93,000 annual attendances) were invited to participate by e-mail during January 2018. Participation was voluntary and no incentives were offered. For the purposes of this study, respondents who did not provide answers to all 11 items of the NFR questionnaire were excluded.

Data Analysis

Data were collected in Microsoft Excel and statistical analysis was performed using IBM SPSS Statistics Version 24. Descriptive statistics were used to describe NFR scores and identify associations with the predetermined respondent characteristics. The median NFR score, with accompanying 95% confidence intervals (95%CI), were calculated for the overall population and then within each additional subgroup. To determine the significance of associations between NFR and respondent characteristics, Mann-Whitney U and Kruskall Wallis tests were undertaken as appropriate. Internal consistency provides an assessment of how reliably individual questionnaire items measure the same concept. Internal consistency of the 11 NFR items was assessed using Cronbach's alpha. A value of >0.7 is generally regarded as an acceptable level of reliability.[20]

Responses to the free text question were subjected to exploratory thematic analysis; [21,22] two researchers (LC, BG) identified initial codes. The independently generated codes were then collated into sub-themes and

themes. As both coders were practising emergency physicians, review was sought from a researcher independent from the ED (JL). Codes, sub-themes and themes were presented together with selected examples of relevant free text comments. Additional care was taken to ensure that the used comments maintained respondents' anonymity, for example by combining those professional groups containing small numbers of respondents.

Outcomes

The primary outcome was the median NFR score amongst the study population. Secondary outcomes included associations between NFR and the selected respondent characteristics, and exploration of qualitative comments. Measurable indicators of questionnaire usability amongst the target population included total response rate, percentage completion, and time taken to complete survey.

Institutional Approval

The chairperson of the local Research Ethics Committee was approached and deemed that ethical approval was not required to conduct the staff survey. The project was registered as a service evaluation project with the host institution (CA_2017-18-147).

Patient and Public Involvement

As this was a staff survey, there was no patient or public involvement in the study design.

Results

One hundred and seventy-three responses were obtained of which 168 (97.1%) completed all NFR items and were eligible for inclusion. This yielded an overall response rate of 80.3%. The average time to complete the survey was less than 7 minutes. Internal consistency of the 11 NFR items was acceptable; Cronbach alpha 0.79.

Nursing and medical staff comprised the majority of respondents (40.4% and 33.9%, respectively). A greater proportion of respondents were female

(69.6%), and most respondents were aged 50 years or under (88.2%). Overall, 35.7% of all respondents reported significant caring responsibilities outside of work and 13% had at least one long term condition or disability. With regard to wellbeing, 42.2% of respondents reported that they felt burned out from work, 73.9% felt at ‘high risk’ of future burnout within the ensuing six months, and 57.8% reported current dissatisfaction with work-life balance. Respondent characteristics are summarised in Table 1.

Responses to the NFR items were non-normally distributed with a negative skew towards high values (Fig.1). The median NFR score within the study population was 81.8 out of 100 (Range 0-100; 95%CI 72.7—81.8) (Table 1). Thirty-nine (23.2%) respondents had a maximum attainable NFR of 100.

Table 1: Results

	n (%)	Median NFR Score (95%CI)	P
Total Sample Size	209	-	
Total Respondents	173	-	
Total Completed Responses	**168 (100)**	**81.8 (72.7-81.8)**	
(a) Baseline Demographics			
Staff Group			0.02[a]
Nursing	68 (40.4)	81.8 (81.8-90.9)	
Medical, non consultant	42 (25.0)	81.8 (63.6- 90.9)	
Medical, consultant	15 (8.9)	72.7 (36.4-90.9)	
Allied Health Professionals ■	31 (18.5)	63.6 (45.5-81.8)	
Other, administration/ support Δ	10 (16.8)	90.9 (72.7-100)	
ND	2 (1.2)		
Gender			
Male	50 (29.8)	81.8 (63.6-90.9)	0.80[b]
Female	117 (69.6)	81.8 (72.7-81.8)	
ND	1 (0.6)		
Age			0.67[a]
21-30	60 (35.7)	81.8 (63.6-81.8)	
31-50	88 (52.4)	81.8 (72.7-100)	
≥51	20 (11.9)	86.3 (81.8-100)	
(b) Rota Characteristics			
Normal shift duration			
>12h	42 (25.0)	81.8 (81.8-90.9)	0.02[b]
≤12h	126 (75.0)	81.8 (72.7-81.8)	-
Working hours			
Full Time▲	120 (71.0)	81.8 (81.8)	0.80[b]
Less than Full Time	41 (24.2)	81.8 (72.7- 90.9)	-
ND	7 (4.2)	-	-
(c) Wellbeing Characteristics			
Caregiving & Health Status			
"I have significant caring responsibilities outside work"			
Yes	60 (35.7)	77.3 (63.6-90.9)	0.56[b]
No	97 (57.8)	81.8 (72.3-90.9)	-
ND	11 (6.5)		
"I have at least one long term Illness or disability"			
Yes	22 (13.0)	81.8 (72.7-81.8)	0.75[b]
No	144 (85.2)	81.8 (72.7-81.8)	-
ND	2 (1.2)		
Occupational Burnout			
"I currently feel burned out"			
Yes	71 (42.2)	90.6 (81.8-90.9)	<0.01[b]
No	86 (51.2)	72.7 (63.6-72.7)	-
ND	11 (6.5)		
"I feel at high risk of burnout in the next 6 months"			
Yes	124 (73.9)	81.8 (81.8-90.9)	<0.01[b]
No	39 (23.2)	54.5 (45.5-63.6)	-
ND	5 (3)		
Work Life Balance			
"I am dissatisfied with my current work-life balance"			
Yes	97 (57.8)	81.8 (81.8-90.9)	<0.01[b]
No	61 (36.3)	72.7 (54.5-72.7)	-
ND	11 (6.5)		

ND Not Disclosed ■ Physiotherapists, occupational therapists and radiographers Δ Reception, secretarial and portering staff. ▲ 'Full time' denotes a reported typical working week ≥37.5hours. [a] Independent Samples Kruskall Wallis Test; [b] Mann-Whitney U Test.

Significant differences were observed in median NFR scores between staff groups (p=0.02). Post-hoc analysis confirmed that the median NFR score for both nursing staff (81.8, 95%CI 81.8- 90.9) and administration/support staff (90.9, 95%CI 72.7-100) was significantly higher than for allied health professionals (AHPs) (p=0.003 and 0.02, respectively). There were no differences in NFR score between other staff groups, and AHPs reported the lowest median NFR scores for any staff group (median NFR 63.6, 95%CI 45.5- 81.8). In addition, average shift duration exceeding 12 hours was also associated with increased NFR scores (81.8, 95%CI 81.8-90.9, p=0.02)(Fig.2). Although a trend towards increased NFR score with advancing age was noted (Fig.3) this was not statistically significant. No differences were observed with regard to gender or among groups reporting long-term conditions or disabilities, caring responsibilities outside of work, or less than full time working.

In relation to wellbeing characteristics, there were significant associations between likelihood of increased median NFR and current self-reported occupational burnout (90.6, 95% CI 81.8- 90.9, p=<0.01), self-reported high risk of future burnout over the next six months (81.8, 95% CI 81.8-90.9, p=<0.01) and current dissatisfaction with work-life balance (81.8, 95% CI 81.8-90.9, p=<0.01). A visual representation of the relationship between individual respondent NFR scores and wellbeing characteristics is provided in Figure 4.

Analysis of free text comments.

A total of 95 free text comments were received. Exploratory thematic analysis revealed 23 codes which were grouped initially into six sub-themes, resulting in two themes; ‘barriers to inter-shift recovery’ and ‘coping with ED work’. Four sub-themes were grouped under the theme ‘barriers to inter-shift recovery’ and were; ‘shift work’, ‘personal circumstances’, ‘maintaining personal wellbeing’, and ‘organisational factors’. The remaining two sub-themes were ‘coping in the present’ and ‘coping in the future’ and were grouped in the second theme ‘coping with ED work’. A summary of results, and selected examples of free text comments are presented in Table 2.

Table 2: Results of exploratory thematic analysis and examples of free text comments

n Theme	Sub- Theme	Code	*Example free text comment*
Barriers to inter-shift Recovery	**A. Shift work**	• Intensity • Length • Working Pattern • Time off between shifts • Flexibility • Planning ahead • Working less than full time	A1 *"I feel like a complete zombie at the tail end of a shift/after getting home. I have no dopamine left with which to gain enjoyment from other activities when I get home from work."* (Foundation Trainee, Male, NFR=90.9)
			A2 *"For me the shift patterns we work in ED is the main reason I struggle to recover and don't get the most out of my days off… we often have a mix of night and day shifts in the space of the same week I find that after a block of nights I need at least 2-3 days before I feel back to 'normal ' again."* (Nurse, Female, NFR=81.8)
			A3 *"As a parent there is an added difficulty of normal family life continuing around late shifts - this often leads to very long days with wake up time set by others in the home and their needs. Self-rostering may help to add flexibility around this."* (Consultant, Female, NFR=81.8)
	B. Personal Circumstances	• Caring commitments • Age • Travelling to work • Finances	B1 *"Hobbies, friends, social life...easy if you don't have commitments such as child care".* (Nurse, Female, NFR=90.9)
			B2 *"I need to work the hours and shifts I do because it is the only combination that fits alongside family life and child care. As a result of these hours I am unable to progress further in my career due to not being able to commit more to my working life."* (Nurse, Female, NFR=53.5)
			B3 *"Traffic means I spend ages commuting thanks to rush hour and road works. I feel although we are lucky in comparison to nursing staff who work 12 hour days, I spend a lot of my day in traffic."* (Allied Health Professional, Female, NFR=36.3)
	C. Maintaining Personal Wellbeing	• Time outside of work • Need for recreation • Need to eat well • Sleep hygiene	C1 *"Post nights we should all have three days off before returning, i.e. sleep day, tired day then social/family/your time day"* (Healthcare assistant, Female, NFR=81.8)
			C2 *"I have random individual time off in lieu days off during the working week. Having these together or just before a weekend or just after so that more than one day off work is had at a time would be better."* (Specialty Trainee, Female, NFR=90.9)
			C3 *'I need to take personal responsibility to do more physical activity but do find this very difficult when I am always so physically worn out.'* (Senior nurse, Female, NFR= 54.5).
	D. Organisational Factors	• Lack of recognition • Need for communication • Work related activities • Physical Environment • Managerial Support	D1 *The department can't be run without front line workers so we need to be supported.* (Nurse, Female, NFR=90.9)
			D2 *"Nurses require a lot of support, they get pulled pillar to post. something to look into and for management to listen rather than ignore"* (Nurse, Female, NFR=90.9)
Coping with ED work	**E. Coping in the present**	• Accessing support • Positive Outlook	E1 *"Mentally I feel robust and I think I have a good support network within the ED is I need help" (Nurse, Female, NFR= 54.5)*
			E2 *"How we cope is within our control. Develop a positive attitude and outlook."* (Nurse, Male, NFR=9.1)
	F. Coping in the future	• Generating solutions	F1 *"More people finishing shift together would provide opportunity for formal or informal debrief."* (Foundation Trainee, Male, NFR=81.8)
			F2 *"We should have group days off together"* (Allied Health Professional, Female, NFR=81.8)
			F3 *"We need to Improve staff morale by celebrating nursing staff more, train us and use our skills"* (Nurse, Female, NFR=36.3)

Within the theme of ‘barriers to inter-shift recovery’, many comments contained codes relating to the sub-theme of ‘shift work’ focusing on intensity, length and pattern of shifts. Some respondents reported feeling exhausted following ED shifts (Table 2; Comment A1), others felt that working a mixed shift pattern contributed to increased need for recovery (Comment A2) or that anti-social shifts adversely affected quality of life (Comment A3). Although quantitative data did not establish any statistically significant relationship, several respondents commented on the perceived impact of additional caring responsibilities, including childcare, on their inter-shift recovery (Comments A3 & B1) with one parent specifically remarking that lack of rota flexibility also restricted career development (Comment B2). Additionally, advancing age, personal financial status and excessive commuting time (Comment B3) all constrained recovery for some respondents. Under the sub-theme of ‘maintaining personal wellbeing’, respondents reported that ED shift work prevented time for recuperation (Comments C1 and C2) and access to regular physical exercise (Comment C3). Several respondents were also critical of the effect of wider organisational factors on inter-shift recovery, and explicitly desired more support from management staff (Comments D1 and D2). Under the theme of ‘coping with ED work’, some respondents communicated their strategies for ‘coping in the present’. One member of nursing staff (Comment E1) highlighted this included awareness of existing support networks (Comment E2) and developing a positive mental outlook as an adaptive coping strategy. Several respondents reflected upon ‘coping in the future’ and suggested a range of discrete improvements to aid recovery including the use of group debriefing (Comment F1), training and ‘away days’ (Comment F2), as well as improved recognition of staff (Comment F3).

Discussion

The median NFR score in this study population exceeds previously reported scores amongst healthcare and non-healthcare related occupations internationally.[8, 12-16] In addition, nearly a quarter of all respondents in our study attained the maximum NFR score. This finding is contrary to baseline general population data, where the highest frequency of responses was observed at the lowest end of the scale. Although the reasons for the high

NFR score obtained in this study are currently unclear, these may relate to operational pressures and workload faced by ED staff at the time of data collection, or personal or cultural differences within this compared to populations studied previously. Further investigation is required to confirm scores amongst ED staff, and to assess the possibility of ceiling effects using the current iteration of the NFR survey. Monitoring the stability of NFR scores over time may allow for the effectiveness of quality improvement strategies aimed at directly improving NFR to be assessed.

Several associations with the selected respondent characteristics were also determined. Specifically, there were high NFR scores amongst ED nursing staff. Impaired wellbeing has previously been identified as a major factor driving job dissatisfaction and workforce attrition amongst UK nurses, and the need to monitor wellbeing has been addressed as a strategic priority.[23] Periodic evaluation of NFR scores may provide a means of contributing towards such an objective. In addition, several trends in keeping with previous studies utilising the NFR scale were also observed. For example, the association between advancing age and risk of higher NFR scores has been previously reported[24,25] and the trend towards higher NFR scores with increased shift duration adds to previous observations that personal effectiveness decreases on 12-hour shifts compared to shorter shifts.[26] In our study, the NFR scores were more favourable amongst allied health professionals. Determining reasons for this observation may highlight areas of desirable practice which may be transferrable to benefit other staff groups, highlighting the potential utility of the NFR survey as a tool to achieve positive change. The reported incidence of disability and long-term conditions among the study population was in keeping with the UK working population average,[27] and did not appear to be associated with NFR scores in our study population. Likewise, quantitative data did not reveal associations between NFR score and caring responsibilities or respondent gender.

Incidence of burnout within the study population is consistent with estimates from elsewhere in the literature.[17-18, 28-29] A statistically significant relationship has been observed between increased NFR score and the presence of

perceived occupational burnout, high risk of future burnout and dissatisfaction with work life balance. This serves to further highlight the possible utility of using the NFR score to assess wellbeing of ED staff. In addition to population trends, individual NFR responses highlight that some respondents report very high NFR scores yet do not align themselves with items aimed at identifying adverse wellbeing. This may indicate that NFR provides an additional construct to occupational burnout and work-life balance, and that measurement of NFR should complement, rather than replace, existing measures. However, it is also plausible that this observation highlights a possible lack of awareness of impaired personal wellbeing amongst some ED staff, and highlight the need to increase self-awareness amongst this population.

Although the open-ended question was intended to provide respondents with the opportunity to communicate their proposed solutions to improving inter-shift recovery, a much broader narrative resulted. Respondents detailed the perceived barriers to inter-shift recovery encountered in practice, and strategies employed to cope with their work. This is the first evaluation of the NFR scale to include qualitative data and highlights the potential value of assessing lived experiences of impaired inter-shift recovery. Whilst the NFR score provides an overview of staff wellbeing at a population level, exploration of individuals' experiences provides important additional insights and 'meaning behind the numbers'.

The straightforward construction and use of dichotomous rating scales within the NFR scale makes it uniquely appealing for routine administration amongst a busy workforce such as that encountered in the ED. The high response rate and apparent ease of completion in under ten minutes confirms usability of the questionnaire amongst this population. Combined, both quantitative and qualitative data from this study may inform interventions aimed at improving staff wellbeing in the ED.

Limitations

The online survey was designed using current best practice guidelines. However, to provide reassurance regarding anonymity and to simplify recruitment, respondents were not required to register for individualised access to complete the survey. As such it was not possible to monitor for duplicate or multiple responses, although none were overtly detected during analysis. Whilst this initial study provides some indication of characteristics that may be associated with increased NFR, the number of respondents is small, and the analysis does not consider possible confounding variables. In addition, the use of a single centre may limit broader generalisability of this study. As such, repeat assessment across multiple centres using a more sophisticated multivariate analysis is desirable before these associations can be confirmed. In addition, measurements of NFR in other UK healthcare populations is lacking and would allow for comparison between the ED and other settings. This study aimed to capture subjective perceptions of burnout and wellbeing amongst ED staff and highlight any possible relationship with NFR. Although the use of validated scales may seem desirable to confirm such associations, the inclusion of large numbers of additional questionnaire items may have led to respondent fatigue and reduced survey completion rates.[30] In addition, previous work suggests that single-item measurement of subjective perception of burnout correlates satisfactorily with the Maslach Burnout Inventory.[31]

For the purposes of this study, only responses where all 11 NFR items had been completed were included in analysis, at least one prior study has proposed imputation of NFR score where equal or greater than eight items have been completed.[4] In this study, no respondent failed to complete less than eight items, highlighting imputation as a possible method of analysis for future work in order to maximise responses.

Although not primarily intended as a qualitative study, respondents who chose to write optional free-text comments contributed to a deeper understanding of the determinants of need for recovery, and researchers felt it was important to report these. To ensure rigour, thematic analysis was adopted from the outset.

Whilst this is not a well-recognised method for gathering qualitative data, purposeful analysis of free text comments has been suggested as a means of providing additional valuable information in previous survey studies.[32]

Conclusion

This study provides quantifiable insight into the high work intensity experienced by staff in a single ED in the UK, with the median NFR score exceeding all previously reported norms. The analysis of free text comments has provided additional information and indicated some potential barriers to inter-shift recovery. It is feasible to use the NFR scale to assess the need for inter-shift recovery amongst ED staff. Further research is warranted to confirm these findings, specific determinants of recovery and in turn produce meaningful recommendations for improving inter-shift recovery amongst ED staff.

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